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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/911,408	07/25/2001	Kenji Inage	110199	4088

25944 7590 02/25/2004

OLIFF & BERRIDGE, PLC  
P.O. BOX 19928  
ALEXANDRIA, VA 22320

EXAMINER

MILLER, BRIAN E

ART UNIT PAPER NUMBER

2652

DATE MAILED: 02/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/911,408

Applicant(s)

INAGE ET AL.

Examiner

Brian E. Miller

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 04 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 5, 10, 15 and 20-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5, 10, 15, 20-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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Claims 5, 10, 15, 20-28 are now pending.

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/31/03 has been entered.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. Claims 5, 10, 15, 20-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamoto et al (US 5,936,810) in view of Gill (US 6,538,859). As to claims 5, 10, 15 and 20, Nakamoto teaches a magnetoresistive device in Fig. 1 comprising a magnetoresistive element 10 having two surfaces that face toward opposite directions and two side portions that connect the two surfaces to each other, two bias field applying layers 12, 12 that are located adjacent to the side portions of the magnetoresistive element and apply a bias magnetic field to the magnetoresistive element, and two electrode layers 14, 14 that feed a current used for signal detection to the magneto resistive element, each of the electrode layers being adjacent to one of the surfaces of each of the bias field applying layers, wherein at least one of the electrode layers overlaps one of the surfaces of the magnetoresistive element the magnetoresistive element incorporates a nonmagnetic layer 20 having two surfaces that face toward opposite directions, a soft magnetic layer 18 adjacent to one of the surfaces of the nonmagnetic layer, a pinned layer

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22, located adjacent to the other one of the surfaces of the nonmagnetic layer, whose direction of magnetization is fixed and an anti-ferromagnetic layer 16 located adjacent to one of the surfaces of the pinned layer that is farther from the nonmagnetic layer, the anti-ferromagnetic layer 16 fixing the direction of magnetization of the pinned layer 22 (col. 7, lines 1-38).

Further, Nakamoto teaches the magnetoresistive device wherein the total length of regions of the two electrode layers that are laid over the one of the surfaces of the magnetoresistive element is smaller than  $0.3\mu\text{m}$  (see Figs. 7 & 14). In FIGs. 7 & 14, the graphs show overlap values down to zero, so therefore would also encompass the claimed "smaller than  $0.15\mu\text{m}$ " limitation(s). As to the electrode spacing, Nakamoto teaches the magnetoresistive device, wherein a space between the two electrode layers is equal to or smaller than approximately  $0.6\mu\text{m}$ , e.g., "preferably  $0.25\text{--}1.5\mu\text{m}$ " (see Fig. 5 and col. 5, lines 15-16).

While Nakamoto does not expressly recite a condition of having the electrode spacing "smaller than approximately  $0.6\mu\text{m}$ " and the overlap amount being "smaller than  $0.3\mu\text{m}$ ", from the teachings of Nakamoto, e.g., FIGs. 8, 14-16, the claimed scenario would be encompassed, or at least obvious therefrom. The motivation would have been: lacking any unobvious or unexpected results, the aforementioned dimension(s) would have resulted through the course of routine engineering optimization and experimentation. Moreover, absent a showing of criticality, the relationships set forth in claims are considered to be within the level of ordinary skill in the art. Additionally, the law is replete with cases in which the mere difference between the claimed invention and the prior art is some range, variable or other dimensional limitation within the claims, patentability cannot be found.

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It furthermore has been held in such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range(s); see *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990). Moreover, the instant disclosure does not set forth evidence ascribing unexpected results due to the claimed dimensions; see *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338 (Fed. Cir. 1984), which held that the dimensional limitations failed to point out a feature which performed and operated any differently from the prior art.

Nakamoto does not teach the pinned layer that includes a nonmagnetic spacer layer and two ferromagnetic layers that sandwich the spacer layer and have direction of magnetization fixed to opposite directions.

Gill teaches a magnetoresistive sensor in Fig. 6, wherein the pinned layer 622 includes a nonmagnetic spacer layer 626 and two ferromagnetic layers 628, 624 that sandwich the spacer layer and have direction of magnetization fixed to opposite directions 629, 625.

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the Nakamoto magnetoresistive sensor having the pinned layer that includes a nonmagnetic spacer layer and two ferromagnetic layers that sandwich the spacer layer and have direction of magnetization fixed to opposite directions, in order to provide an sensor having a low intrinsic uniaxial anisotropy as taught by Gill (see col. 1, lines 20-21).

As to claims 5, 24, 26, 28, Nakamoto teaches the magnetoresistive device in FIG. 1, wherein the two bias field applying layers, 12, 12 are located off one of the surfaces of the magnetoresistive element 10.

***Response to Arguments***

4. Applicant's arguments filed 2/4/04 have been fully considered but they are not persuasive.

A...Applicant's main argument is that "Nakamoto does not disclose or suggest a total length of regions of the two electrode layers that are laid over the one of the surfaces of the magnetoresistive element is smaller than the 0.3  $\mu\text{m}$  and a spacing between the two electrode layers is equal to or smaller than approximately 0.6 $\mu\text{m}$ ."

The Examiner maintains that Nakamoto's teachings would encompass this specific scenario, however, assuming arguendo, would have at least been obvious to a skilled artisan if not expressly taught, as described, supra. While the data of Figs. 7 & 14 only show a case when the electrode spacing is set to 1.0 $\mu\text{m}$ , the disclosure clearly sets forth that this spacing could be between 0.25 and 2 $\mu\text{m}$  (see col. 5, lines 15-16). Applicant has not set forth evidence ascribing unexpected results due to the claimed dimensions and/or pointed out a feature which performed and operated any differently from Nakamoto.

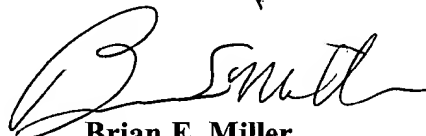
***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian E. Miller whose telephone number is (703) 308-2850. The examiner can normally be reached on M-TH 7:15am-4:45pm (and every other Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "B. Miller", is positioned above the printed name and title.

**Brian E. Miller**  
**Primary Examiner**  
**Art Unit 2652**

Bem  
February 23, 2003